ARS Aleut Remediation

November 4, 2018

Mr. Chris McLellan
Hard Rock Construction, L.L.C.
1255 Peters Rd
Harvey, La 70058

RE: AAR Response to Louisiana DEQ Inquiry and the City of New Orleans – Ra226 Source Removal and Disposal, New Orleans, LA per DOE Triage Incident Report (TIR) for TE-13-0927

Dear Mr. McLellan:

ARS Aleut Remediation, LLC (AAR) hereby provides the requested cost estimate and associated technical approach for the removal, packaging, transport, and disposal of a radioactive Radium-226 (Ra226) source believed to be located approximately 12"-16" beneath the surface of Lowerline Street in New Orleans, LA. While there are still some uncertainties described in the referenced DOE TIR for TE-13-0927, AAR provides this cost estimate to complete the scope of work based on our listed assumptions and excluding work in excess of the assumptions as listed. Our assumptions align with the assumptions identified in the referenced DOE TIR. This cost estimate is a bid to perform services.

Basis for Cost Estimate
The AAR ROM Cost Estimate is based on the ASSESSMENT section of the DOE TIR for TE-13-0927, which states:

> *"The presence of neutrons was not evident in the collected spectra. No SNM signatures were identified in the spectra. No threat was determined, consistent with the 2013 assessment. Our confidence level for Ra226 identification is high, based on excellent quality of the collected spectra. The activity is 1-10 mCi with high confidence. However, we cannot differentiate between a point source and a highly-localized but distributed source."*

The AAR ROM Cost Estimate, therefore, is based on either of the possible subsurface conditions to be encountered between the following two scenarios:

1. A single Ra226 point source, with an activity of up to 10 mCi, and
2. A highly-localized but distributed Ra226 source, with an activity of approximately 10 mCi.

The assumptions supporting this provide the following maximum bound on cost:

1. A single "2R" overpack to dispose of the source. The overpack is a 2-inch diameter section of threaded pipe with a cap on each end. The overpack will be encased in concrete inside a single 55-gallon drum and disposed of at an U.S. Nuclear Regulatory Commission or Agreement State licensed facility,
2. All of the source material will fit inside a single overpack and a single drum,
3. All of the contaminated asphalt and soil will fit in no more than five (5) 55-gallon drums.

The field work at Lowerline Street includes the following primary elements:

1. Mobilization to the Site
2. Deployment of Road Blocks and Established Detours

3. Site preparation including setting up access control, decontamination station, equipment, plastic sheeting to control potential contamination, a portable shelter (weather dependent), stormwater management (weather dependent), air monitors, assignment of thermoluminescent dosimeters (TLD), as necessary.
4. Locating, Saw Cutting, and Removal of Approximately 25 square feet (SF) of Street Surface
5. Careful, Guided Excavation of the Intended Area
6. Scanning and properly disposing of the asphalt, either as contaminated debris or as general construction debris depending on radiological survey results
7. Scanning and segregating soils
8. Survey of the soil under the removed asphalt
9. Collection of post excavation confirmatory soil samples
10. Characterization, packaging, transport, and disposal of radiologically contaminated wastes and the Ra-226 source.

All work will be conducted in accordance with ARS's radioactive material license, LA-7153-L02, as issued by the Louisiana Department of Environmental Quality.

Work Scope

Regardless of whether the source is a single intact source or a leaking source, the basis is the same. Ra226 source, with an activity of less than or equal to 10 mCi, is located approximately 12"-16" below grade in the center of Lowerline Street at the exact coordinates provided in the referenced TIR. AAR believes the Lowerline Street field work for this removal will be performed in one day (excluding street repair) including all packaging and transport of the single Ra226 point source. As the guided excavation proceeds, subsequent tasks would include the following primary elements:

1. Verification of Source Location and Activity
2. Removal and Immediate Packaging of Point Source for Disposal
3. Verification of less than "Twice Background" in Open Excavation and Staged Material
4. Collection of Confirmatory Soil Sample After Excavation and Final Survey
5. Backfill with Non-Impacted (clean) Fill
6. Limited Repair of Street Surface
7. Removal of Road Barricades and Demobilization
8. Temporary packaging for transport from the Lowerline Street site to ARS Aleut Analytical lab in Port Allen, LA for storage while analysis and manifesting is completed for disposition.

Disposal of up to 10 mCi Ra226 source disposal would utilize a "2R" type overpack. The Source would be encapsulated in a capped iron pipe and stabilized in a type 7A drum with concrete. Once the source has been removed from the excavation, surveys will be conducted to determine the magnitude and extent of soil contamination. A sufficient amount of soil will be removed in order to remediate any residual contamination while also ensuring that the concentration of Ra-226 in the waste does not exceed 1500 pCi/g. Up to 5 drums of soil may need to be excavated. All contaminated materials would be packaged and transported to ARS's Port Allen facility for final stabilization and packaging prior to shipment to U.S. Ecology for disposal.

Cost Estimate

The AAR ROM cost estimate range is established by pricing The scope of work from planning through final disposal of the Ra226 wastes, as follows:

Item	Description	Adjusted Cost
Task 1	Project Planning	$ 12,129
Task 2	Mobe and Site Prep	$ 10,301
Task 3	Removal and Scan	$ 16,712
Task 4	Demobe	$ 11,718
Task 5	Transportation and Disposal	$ 12,329
Task 6	Final Reports	$ 891
	Grand Total	**$ 64,079**

Assumptions

1. There is no water in the excavation and soil is reasonably dry
2. Contamination is localized and the excavation is limited to 4-feet by 4-feet by 16-inches below bottom of asphalt
3. Field crew for includes a PM, CHP, Waste Shipper, RCT and Operator.
4. The excavator, bucket, and other heavy tools and equipment will meet free-release criteria following field decontamination.
5. Weather is good and does not impede work. We have estimated the cost for a temporary shelter to provide shelter from rain for the people and drums, so that if necessary we can load in the dry.
6. Once the asphalt is removed, excavation will continue until complete or Assumption 2 is exceeded.
7. Disposal requires one "2R" package for the source and no more than five drums for contaminated soil/asphalt, 1 drum for PPE/plastic and decontamination wastes.
8. Assumed 3 waste samples and 2 post-excavation soils.
9. DOE's survey and report are correct, the location is correct and the source is not emitting neutrons.
10. The basic assumption of "twice background" as the no further action level is acceptable by LDEQ.
11. Hard Rock Construction will:
    a. Set up the site with signs and barricades
    b. Saw cut the asphalt and remove it from the excavation
    c. Support AAR in setting up the excavation staging, decon, etc.
    d. Provide AAR with a compact tracked excavator
    e. Provide light plants as needed for safe work
    f. Provide capability to move and load loaded 55-gallon drums

Summary

With the information provided and the basic assumption of "twice background" as the no further action level for the removal of any Ra226 contamination in Lowerline Street. Should you have any questions in regard to this ROM Cost Estimate prior to your response, please contact me at 303-653-5161 or glord@aar-llc.com. Also, Kelly Ausbrooks may be reached at 270-564-1800 or kausbrooks@aar-llc.com for technical clarifications. Thank you.

Sincerely,

G. Greg Lord

G. Greg Lord
Senior Project Manager
ARS Aleut Remediation, LLC

CC: Joseph Hampel
Kelly Ausbrooks
Darrin Lawrence
Steve Shirley